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POVERTY REDUCTION STRATEGY IN MADURA: A PANEL DATA REGRESSION ANALYSIS

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ABSTRAK

This research aims to evaluate the influence of gross regional domestic product, economic growth, and human development index on poverty levels in four Madura districts: Bangkalan, Sampang, Pamekasan, and Sumenep. We analyze secondary data, including annual data from 2014-2023, using the panel data regression method. The research results show that gross regional domestic product has a significant positive influence on poverty levels, indicating that increasing economic activity can increase poverty due to potential inequality in economic distribution. Conversely, research demonstrates a significant negative impact of economic growth and the human development index on poverty levels. This means that increasing economic growth and human development can effectively reduce the level of poverty in Madura. The policy implications necessitate the implementation of more inclusive strategies to promote equitable distribution of economic benefits throughout the region and underscore the significance of investing in human development to enhance the quality of life and economic prospects of Madurese individuals.

Kata Kunci: Gross Regional Domestic Product, Economic Growth, Human Development Index, Poverty

1. INTRODUCTION

Poverty is a serious challenge that has been a global concern for many years. According to the World Bank's definition, poverty is not just a financial shortage but rather a condition where individuals or community groups do not have adequate access to the resources needed to meet their basic needs (Hernawati, 2017). Global attention to poverty eradication continues to increase, both in developed and developing countries. This is due to estimates that approximately 150 million people worldwide will fall into extreme poverty and face food insecurity as a result of the pandemic (Mamun & Ullah, 2020).

The poverty rate in Indonesia has tended to be low since the New Order era, but it is still quite high. According to data from the Central Statistics Agency (BPS) (2023), the percentage of poor people in Indonesia reached 9.36%, or around 25.90 million people, in March 2023. In March 2023, the poverty line will be IDR 550,458 per capita per month, consisting of a food poverty line of Rp. 408,522 (74.21 percent) and a non-food poverty line of IDR 141,936 (25.79 percent).

Efforts to reduce poverty in the field appear to be the sole responsibility of the government. This is due to the numerous calls for the government to provide various forms of support, such as basic needs assistance, business capital, free health services, and other assistance. Even though aid from the government continues to flow, the country's economic condition has not fully recovered after experiencing a recession. Therefore, it is time for all elements of society to participate in supporting government programs to overcome this serious poverty problem.

At the regional level, poverty, particularly in the districts of Madura Island, is the highest in East Java Province. Sampang Regency recorded the highest poverty rate in a row, with a poor population of 221,710 people. The low level of domestic product production has not been able to increase people's per capita income. This further reinforces the notion that low education levels, as measured by the Human Development Index (HDI), have a significant impact on the quality of human resources. Therefore, we can conclude that the workforce's quality decreases with a lower education level(Yubilianto, 2020).

As a result, the population's average income is low, making it difficult for them to meet their daily needs and classifying them as poor. The poverty level in the districts of Madura Island during the 2014–2023 period has decreased, although not significantly. However, the poverty level is still above the average percentage for East Java province. Regional and central governments have attempted to reduce poverty levels by implementing a variety of poverty alleviation programs (Todaro & Smith, 2012). However, these programs have not been able to show optimal results.

Most previous research focused more on the relationship between economic growth and poverty without considering other variables in depth, such as GRDP (gross regional domestic product) and the Human Development Index (HDI). Often conducted at the macro level, research on poverty in Madura fails to provide a detailed picture at the district level. This research employs a multivariate approach, including GRDP, economic growth, and HDI as independent variables and poverty reduction as the dependent variable. This approach provides a more comprehensive analysis of the factors that influence poverty.By using data from 2014 to 2023, this research can capture the dynamics of change and relevant long-term trends.

This flowchart illustrates poverty alleviation strategies in Madura through approaches involving GRDP, HDI, and economic growth. GRDP focuses on infrastructure development, industrial growth, and agricultural enhancement. Infrastructure includes investment in roads, bridges, and other facilities to boost the local economy. Infrastructure development and the enhancement of GRDP can be carried out through an inclusive approach, improving access to education and healthcare (HDI), while ensuring that economic growth not only focuses on short-term outcomes but also considers environmental sustainability (Li & Zhou, 2024). Industrial growth aims to diversify the economy and create jobs, while agricultural

enhancement improves productivity through modern techniques (Erlando et al., 2020).

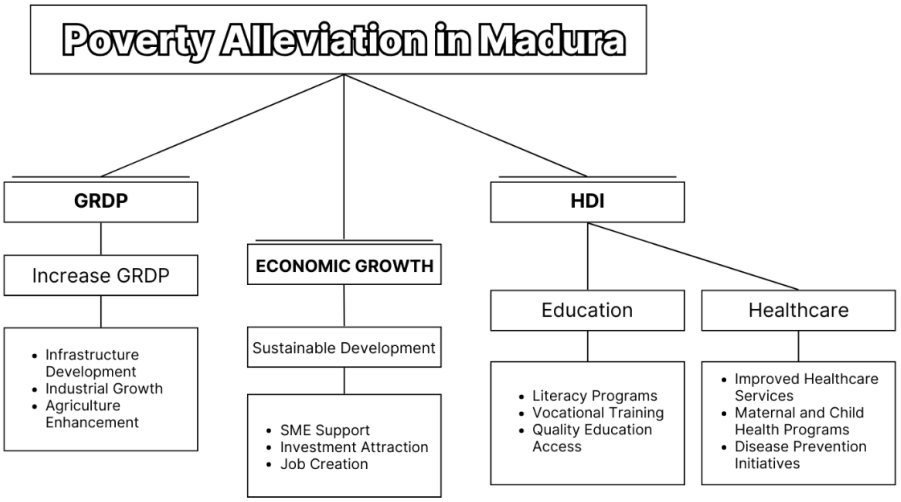


Figure 1. Mind Map Poverty Alleviation in Madura

2. RESEARCH METHOD

Panel data regression is a development of regression analysis that combines time series data and cross-sectional data. Panel data regression techniques are often used to observe data that is observed continuously over several periods. The advantage of panel data regression analysis is its ability to consider the diversity that exists between cross-section units and provide richer information than simple overall time series analysis. The following is the panel data regression equation in this research.

$$\boldsymbol{Poverty = \beta_0 + \beta_1 GRDP_{it} + \beta_2 EGROWT_{it} + \beta_3 HDI_{it} + \varepsilon_{it}}$$

The equation above analyzes poverty by calculating the percentage of impoverished individuals; it calculates the gross regional domestic product (GRDP) from the business sector; it calculates the economic growth by comparing a specific year with the base year, expressed in percentage form. Sumenep Regency's education and health sectors provide the HDI, a human development index. This study uses Madura Island's district population, which consists of four districts: Bangkalan district, Sampang district, Pamekasan district, and Sumenep district. The samples used in this research were the four districts with a time period of 2014–2023. We collect data using the documentary method, which involves gathering accurate physical evidence from published sources, downloading the data source file, and copying it. Documents collected in this research include "East Java Province in Figures" from various publication years and data from the East Java Province Central Statistics Agency. This research employs multiple linear regression analysis with panel data, processed through Eviews 10 software

3. RESULT AND DISCUSSION

Descriptive Statistic

Descriptive statistics is a branch of statistics that involves the process of collecting, presenting, and explaining data in an easy-to-understand form. The goal is to summarize and describe the main characteristics of an existing data set (Ghozali, 2006). The following is a table of descriptive statistical analysis results.

Table 1. Descriptive Statistic

	POVERTY	GRDP	EGROWTH	HDI
Mean	1.290061	4.192052	2.552536	1.803958
Median	1.304706	4.197307	2.706095	1.805398
Maximum	1.411620	4.419043	3.147397	1.836387
Minimum	1.141450	3.946757	0.968778	1.755722
Std. Dev.	0.072083	0.132894	0.464666	0.018430
Skewness	-0.636741	0.032848	-1.645117	-0.500078
Kurtosis	2.724069	1.905773	5.655823	3.010165
Jarque-Bera	2.829824	2.002747	29.79839	1.667359
Probability	0.242947	0.367375	0.000000	0.434448
Sum	51.60242	167.6821	102.1014	72.15834
Sum Sq. Dev.	0.202645	0.688776	8.420655	0.013247
Observations	40	40	40	40

Source: Proceed by Researcher (2024)

Based on a descriptive statistical analysis of data on poverty reduction, Gross Regional Domestic Product (GRDP), economic growth, and the Human Development Index (HDI) in districts on Madura Island, several significant findings can be revealed. First, the average reduction in poverty was recorded at 1.290061, with the median slightly higher at 1.304706. The distribution of poverty reduction data shows a leftward slope (negative skewness = -0.636741), which means there are more districts with a greater reduction in poverty than the average. With a low standard deviation (0.072083), this indicates little variation between the data, so poverty reduction is consistent across districts. Although the Jarque-Bera value is not significant (probability 0.242947), which indicates a data distribution that is close to normal.

In the GRDP analysis, the average was recorded as 4.192052 with a very close median at 4.197307, indicating a symmetrical data distribution (skewness 0.032848). The small standard deviation (0.132894) indicates that the GRDP in these districts is relatively homogeneous. A kurtosis lower than 3 (1.905773) indicates that the GRDP data distribution is somewhat flat compared to a normal distribution. These results show the stability of GRDP in all districts on Madura Island.

Economic growth shows a different pattern, with an average of 2.552536 and a higher median of 2.706095. Very negative skewness (-1.645117) indicates that most districts have higher than average economic growth rates, with some districts having very low growth that

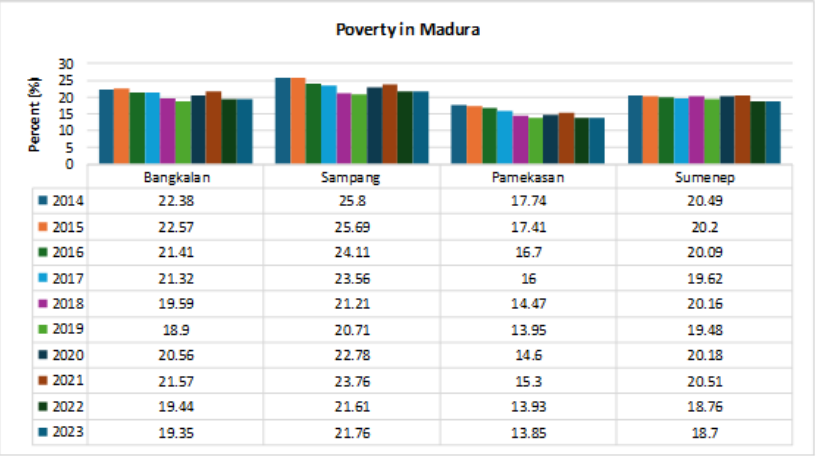
pulls down the average. A larger standard deviation (0.464666) indicates greater variation among the districts. A high kurtosis value (5.655823) indicates that there is a sharper distribution peak than a normal distribution, and a very significant Jarque-Bera value (probability 0.000000) indicates that this data distribution is very non-normal. This shows that there are significant differences in the level of economic growth between districts on Madura Island.

Finally, analysis of the HDI shows a mean of 1.803958 with a very close median of 1.805398, indicating a very symmetric data distribution with a small negative skewness (-0.500078). The very small standard deviation (0.018430) shows that the HDI is very consistent across districts. A kurtosis close to 3 (3.010165) indicates that the HDI distribution is almost normal. The non-significant Jarque-Bera value (probability 0.434448) also supports the conclusion that the HDI distribution is close to normal. Overall, the data shows that the reduction in poverty and HDI in the districts on Madura Island is quite consistent and stable, while economic growth shows greater variations and an abnormal distribution.

GRDP also shows significant stability with symmetric and homogeneous data distributions. These findings provide important insights for policymakers and researchers in understanding the economic and social dynamics on Madura Island, as well as in designing more effective interventions to reduce poverty and improve human development in the area.

Regency Poverty Condition in Madura

Despite significant challenges, especially during the COVID-19 pandemic, all four districts on Madura Island have succeeded in reducing their poverty rates from 2014 to 2023. Pamekasan showed the most impressive results with the lowest poverty rate, while Sampang faced the greatest challenge with the highest poverty rate. We need to continue reducing poverty and improving the welfare of communities throughout Madura Island through continuous efforts and appropriate policies. The following is data on poverty development in Madura Island's districts.



	Bangkalan	Sampang	Pamekasan	Sumenep
2014	22.38	25.8	17.74	20.49
2015	22.57	25.69	17.41	20.2
2016	21.41	24.11	16.7	20.09
2017	21.32	23.56	16	19.62
2018	19.59	21.21	14.47	20.16
2019	18.9	20.71	13.95	19.48
2020	20.56	22.78	14.6	20.18
2021	21.57	23.76	15.3	20.51
2022	19.44	21.61	13.93	18.76
2023	19.35	21.76	13.85	18.7

Source: Central Bureau of Statistic (2024)

Figure 2. Percentage of District Poor Population in Madura

Based on the percentage of poor people in four districts on Madura Island from 2014 to 2023, we can see trends and fluctuations that reflect various economic and social dynamics that occurred during that period. Bangkalan Regency started with a poverty rate of 22.38% in 2014 and managed to reduce it gradually to 19.35% in 2023. This decrease indicates significant efforts in poverty alleviation, although there was a spike in 2020 and 2021, which is likely caused by the impact of the COVID-19 pandemic. After peak poverty in 2021, Bangkalan was able to reduce poverty levels again in the following two years, showing quite a good recovery.

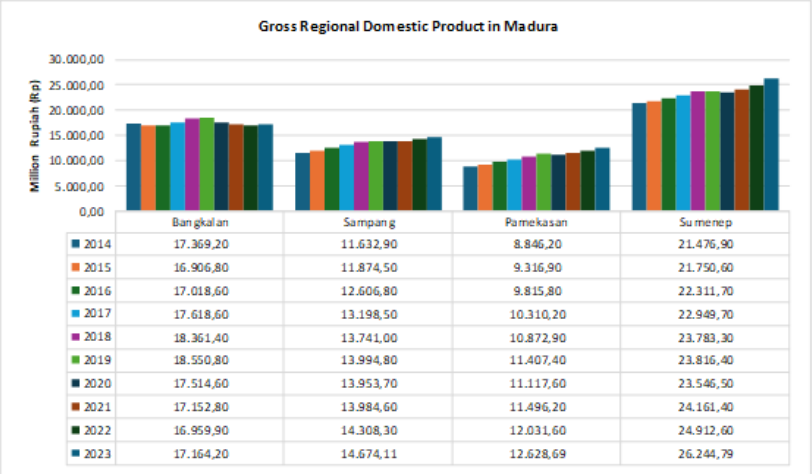
In Sampang Regency, the percentage of poor people also showed a significant decline, from 25.80% in 2014 to 21.76% in 2023. Even though Sampang has the highest poverty rate among the four districts, this downward trend is worthy of appreciation. However, just like in Bangkalan, the COVID-19 pandemic also affected Sampang, as evidenced by an increase in poverty in 2020 and 2021. After that, Sampang showed signs of recovery, with a reduction in poverty in the following years.

Pamekasan showed the most consistent and encouraging results. Starting from 17.74% in 2014, the poverty rate in Pamekasan continues to decline almost every year, reaching 13.85% in 2023. Although there was a slight increase in 2020 and 2021, this district managed to overcome the impact of the pandemic quite well, as can be seen from a significant decline in subsequent years. Pamekasan has the lowest poverty rate among the four districts, demonstrating the effectiveness of poverty alleviation programs in the region.

Sumenep Regency also shows a trend of decreasing poverty, albeit with some fluctuations. Starting at 20.49% in 2014, the poverty rate decreased to 18.70% in 2023. However, an increase in poverty occurred in 2018 and then in 2020–2021, which can be attributed to the impact of the pandemic. After that, Sumenep showed a strong recovery, with a decrease in the percentage of poverty in 2022 and 2023.

State of Gross Regional Domestic Product in Regencies in Madura

The data presented includes GRDP (in millions of rupiah) from four districts on Madura Island, namely Bangkalan, Sampang, Pamekasan, and Sumenep, from 2014 to 2023. The following is a graph of the development of District GRDP on Madura Island.



	Bangkalan	Sampang	Pamekasan	Sumenep
2014	17.369,20	11.632,90	8.846,20	21.476,90
2015	16.906,80	11.874,50	9.316,90	21.750,60
2016	17.018,60	12.606,80	9.815,80	22.311,70
2017	17.618,60	13.198,50	10.310,20	22.949,70
2018	18.361,40	13.741,00	10.872,90	23.783,30
2019	18.550,80	13.994,80	11.407,40	23.816,40
2020	17.514,60	13.953,70	11.117,60	23.546,50
2021	17.152,80	13.984,60	11.496,20	24.161,40
2022	16.959,90	14.308,30	12.031,60	24.912,60
2023	17.164,20	14.674,11	12.628,69	26.244,79

Source: Central Bureau of Statistic (2024)

Figure 3. District Gross Regional Domestic Product in Madura

An analysis of the development of gross regional domestic product in four districts on Madura Island, namely Bangkalan, Sampang, Pamekasan, and Sumenep, from 2014 to 2023 reveals various interesting economic trends and dynamics. Data shows that GRDP in Bangkalan Regency has experienced quite significant fluctuations. Starting with a value of 17,369.20 million rupiah in 2014, Bangkalan's GRDP fell to 16,906.80 in 2015 before rising again and reaching a peak of 18,550.80 million rupiah in 2019. However, the COVID-19 pandemic seems to have affected GRDP in 2019. Next year, there will be a clear decline from 2020 to 2022, although a slight recovery is seen in 2023 with a value of 17,164.20 million rupiah. Sampang Regency, on the other hand, shows a more consistent trend of increasing GRDP. Starting from 11,632.90 million rupiah in 2014, Sampang's GRDP has increased every year, reaching 14,674.11 million rupiah in 2Sampang Regency managed to maintain stable economic growth even during the pandemic period, as evidenced by the significant increase between 2016 and 2017.

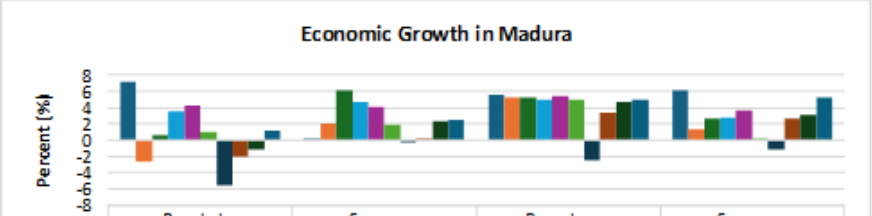
Pamekasan Regency also shows a consistent upward trend in GRDP, from 8,846.20 million rupiah in 2014 to 12,628.69 million rupiah in 2023. The impact of the COVID-19 pandemic likely caused a slight decline in 2020, but Pamekasan quickly recovered and continued its upward trend in subsequent years. The years 2017 and 2018 witnessed the most significant growth. The Sumenep Regency had the highest GRDP of the four districts. With a GRDP of 21,476.90 million rupiah in 2014, Sumenep experienced a steady increase every year, reaching 26,244.79 million rupiah in 2023. Although there was a slight decline in 2020, Sumenep showed rapid recovery and significant growth thereafter, especially between 2021 and 2022.

Overall, this data analysis shows that despite the negative impact of the COVID-19 pandemic on GRDP in several districts, long-term trends show positive economic growth across Madura Island. Sumenep and Pamekasan districts stand out for their strong economic

resilience, which may be due to economic diversification, sustainable investment, and effective resource management. Sampang Regency also showed stable growth, whereas Bangkalan experienced more fluctuations but still recovered in 2023. These findings provide important insights for policymakers to understand the economic dynamics in each district and design more effective interventions to encourage sustainable economic growth. sustainable throughout Madura Island. We can implement strategies such as increasing infrastructure investment, diversifying the economy, and strengthening economic sectors that are most vulnerable to external shocks like pandemics.

The status of economic growth in Madura's districts is currently under review.

The data presented shows the annual economic growth rate of four districts on Madura Island, namely Bangkalan, Sampang, Pamekasan, and Sumenep, during the period 2014–2023. The following is a descriptive statistical analysis and interpretation of economic growth trends in each district.



	Bangkalan	Sampang	Pamekasan	Sumenep
2014	7,19	0,08	5,62	6,23
2015	-2,66	2,08	5,32	1,27
2016	0,66	6,17	5,35	2,58
2017	3,53	4,69	5,04	2,86
2018	4,22	4,11	5,46	3,63
2019	1,03	1,85	4,92	0,14
2020	-5,59	-0,29	-2,54	-1,13
2021	-2,07	0,22	3,41	2,61
2022	-1,12	2,31	4,66	3,11
2023	1,2	2,56	4,96	5,35

Source: Central Bureau of Statistic (2024)

Figure 4. Economic Growth in Regencies in Madura

Economic growth in four districts on Madura Island, namely Bangkalan, Sampang, Pamekasan, and Sumenep, shows various dynamics and fluctuations during the period 2014-2023. Bangkalan Regency, for example, experienced significant changes in its level of economic growth. In 2014, Bangkalan recorded quite high economic growth of 7.19%, but experienced a drastic decline to -2.66% in 2015. After that, Bangkalan's economic growth fluctuated, reaching a peak growth of 4.22% in 2018. However, the impact of the COVID-19 pandemic was very visible in 2020, when economic growth fell sharply to -5.59%. Although there is a slight improvement in 2023 with positive growth of 1.2%, overall, Bangkalan shows an unstable trend and requires stronger policy interventions to achieve more sustainable growth.

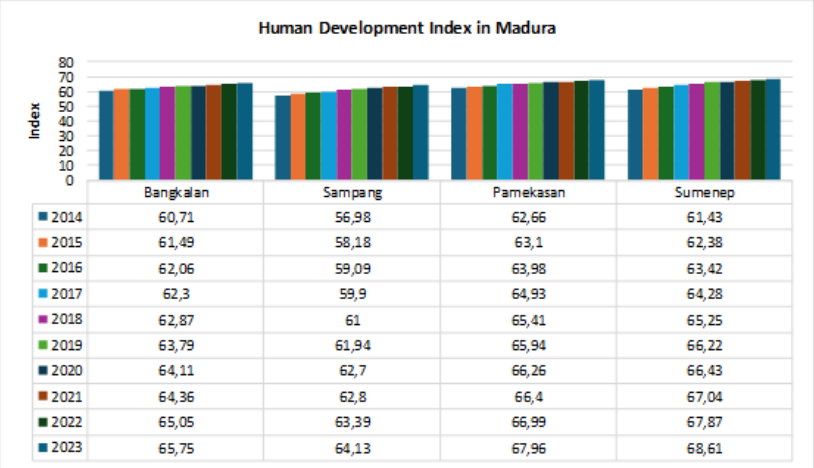
Sampang, on the other hand, shows a more stable and consistent trend compared to Bangkalan. Although Sampang's economic growth in 2014 was only 0.08%, it increased significantly in the following years, reaching its peak in 2016 with growth of 6.17%. Sampang also suffered during the pandemic, but the decline was not as drastic, with the growth rate only slightly dropping to -0.29% in 2020. After the pandemic, Sampang showed a fairly good recovery, with stable positive growth in 2022 and 2023, respectively, of 2.31% and 2.56%.

Throughout this period, Pamekasan demonstrated a relatively stable growth trend. From 2014 to 2019, Pamekasan consistently recorded good economic growth rates, ranging from 5.04% to 5.62%. However, the pandemic's impact in 2020 led to a decline in economic growth to -2.54%. Despite this, Pamekasan was able to recover quickly, with growth increasing again to 3.41% in 2021 and continuing to rise until reaching 4.96% in 2023. The stability and ability to recover quickly show that Pamekasan has strong economic fundamentals and effective strategies for dealing with crises.

Sumenep Regency's economic growth has also fluctuated. In 2014, Sumenep recorded economic growth of 6.23%, but this decreased sharply in 2015 to 1.27%. Despite this, Sumenep managed to maintain positive growth in the following years, although at a lower rate than at the beginning of the period. The impact of the pandemic was very visible in 2020, when economic growth fell to -1.13%. However, Sumenep showed a significant recovery after the pandemic, with economic growth reaching 3.11% in 2022 and peaking in 2023 at 5.35%.Overall, this analysis shows that although the COVID-19 pandemic has had a significant negative impact on economic growth in all four districts, there are also signs of a strong recovery in the following years. Sampang Regency shows relatively excellent economic resilience, with a smaller decline and faster recovery than other districts. Pamekasan and Sumenep also showed a positive recovery trend after declining during the pandemic. Meanwhile, Bangkalan Regency experienced more significant fluctuations and required deeper intervention to achieve economic stability.

The status of the District Human Development Index in Madura is currently under review.

The Human Development Index (HDI) is an important indicator for measuring the development progress of a region. HDI includes aspects of health, education, and living standards (Ranis et al., 2006). The following is an analysis of the development of HDI in four districts on Madura Island, namely Bangkalan, Sampang, Pamekasan, and Sumenep, from 2014 to 2023.



	Bangkalan	Sampang	Pamekasan	Sumenep
2014	60,71	56,98	62,66	61,43
2015	61,49	58,18	63,1	62,38
2016	62,06	59,09	63,98	63,42
2017	62,3	59,9	64,93	64,28
2018	62,87	61	65,41	65,25
2019	63,79	61,94	65,94	66,22
2020	64,11	62,7	66,26	66,43
2021	64,36	62,8	66,4	67,04
2022	65,05	63,39	66,99	67,87
2023	65,75	64,13	67,96	68,61

Source: Central Bureau of Statistic (2024)
Figure 5. Human Development Index in Districts in Madura

In the 2014–2023 period, analysis of the Human Development Index (HDI) in four districts on Madura Island, namely Bangkalan, Sampang, Pamekasan, and Sumenep, shows a significant upward trend in the aspects of health, education, and living standards of the population. HDI is an important indicator that reflects a region's progress in improving the quality of life for its population.

Bangkalan Regency showed consistent improvement from 60.71 in 2014 to 65.75 in 2023. Although there were periods of slower growth, such as between 2017 and 2018, the district recorded continued progress overall. Sampang also recorded a steady increase from 56.98 in 2014 to 64.13 in 2023. Despite experiencing slower increases in some years, such as between 2020 and 2021, Sampang managed to achieve substantial increases in 2023. Pamekasan showed the most consistent and significant increase compared to other districts, from 62.66 in 2014 to 67.96 in 2023. This reflects Pamekasan's success in improving the health, education, and living standards of its residents.

Sumenep recorded a steady and significant increase, from 61.43 in 2014 to 68.61 in 2023. Every year, the district recorded consistent increases, with the highest HDI achievement in 2023, indicating continued progress in human development.Overall, during this period, all districts on Madura Island showed a consistent trend of increasing HDI. Despite the challenges of the COVID-19 pandemic, the four districts managed to demonstrate the ability to recover and continue increasing HDI after 2020.The differences in the rate of increase in HDI between districts highlight the importance of appropriate and sustainable development strategies in improving the population's quality of life. These findings suggest that other districts that still need to improve their HDI can use the success of Pamekasan and Sumenep as a model for policy implementation.

Panel Data Regression Analysis

Based on the results of the model determination test, it was found that the common effect model was the most suitable result after testing the Chow, Hausman, and Lagrange multipler tests. The following are the results of the panel data regression analysis.

Tabel 2. Results of Panel Data Regression Analysis

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	5.825878	0.539807	10.79251	0.0000
GRDP	0.297776	0.042138	7.066656	0.0000
EGROWTH	-0.027554	0.012024	-2.291604	0.0279
HDI	-3.167356	0.312046	-10.15028	0.0000
R-squared	0.799285	Mean dependent var		1.290061
Adjusted R-squared	0.782558	S.D. dependent var		0.072083
S.E. of regression	0.033613	Akaike info criterion		-3.853171
Sum squared resid	0.040674	Schwarz criterion		-3.684283
Log likelihood	81.06341	Hannan-Quinn criter.		-3.792106
F-statistic	47.78618	Durbin-Watson stat		0.684622
Prob(F-statistic)	0.000000			

Source: Proceed by Researcher (2024)

The regression test results allow us to derive the following regression equation:

$$\boldsymbol{Poverty = 5.825878 + 0.297776 - 0.027554 - 3.167356 + \varepsilon_{it}}$$

The constant coefficient (5.825878) shows the estimated poverty level when all independent variables (GRDP, EGROWTH, HDI) are equal to zero. In this context, a value of 5.825878% indicates the basic poverty level. GRDP has a positive coefficient of 0.297776, which is statistically significant. We estimate that a 1% increase in GRDP leads to a 0.297776% increase in the poverty rate. We can interpret this to mean that higher economic growth typically leads to an increase in poverty levels.

EGROWTH: The coefficient is negative (-0.027554) and statistically significant. This means that every 1% increase in economic growth is estimated to reduce the poverty rate by 0.027554%. In other words, higher economic growth can help reduce poverty levels.

HDI: The coefficient is negative (-3.167356) and statistically significant. We estimate that a 1% increase in HDI reduces the poverty rate by 3.167356%. This shows that increasing the human development index can be significant in reducing poverty.This research uses simple linear regression to examine the impact of Gross Domestic Product (GRDP), Economic Growth (EGROWTH), and Human Development Index (HDI) on poverty levels in four districts in Madura: Bangkalan, Sampang, Pamekasan, and Sumenep. The results of the analysis show that these three variables have a significant influence on the level of poverty in this region.

First, the GRDP has a significant positive coefficient, indicating that economic improvements in Madura Regency in general can potentially increase poverty levels. Although GRDP reflects gross economic activity, uneven income distribution or a focus on certain

sectors can increase economic inequality and poverty in some parts of the district. These results are consistent with Lavenia's findings (Lavenia et al., 2023) which show that GRDP has a positive and significant influence on poverty in West Java Province and Leonita (Leonita & Kurnia Sari, 2019) GRDP Province in Indonesia. Sectors of the economy that are already well-developed or receiving large investments are likely to feel the most of the impact when GRDP increases.

However, the impact on poverty reduction may be lower or even uneven across Madura districts, depending on factors such as accessibility to jobs related to economic growth as well as the community's ability to take advantage of the resulting economic opportunities.

Second, economic growth has a significant negative coefficient, indicating that efforts to increase economic growth can contribute significantly to reducing poverty levels in Madura. This finding is consistent with research by Iqbal Salsabil (Iqbal Salsabil & Westi Rianti, 2023) that the rate of economic growth has a negative and significant effect on poverty levels in West Java province in 2016–2020. However, this finding is inconsistent with Hasibuan's findings (Hasibuan, 2023) which stated that economic growth had no significant effect on reducing poverty. Stronger economic growth can create new jobs and increase people's income, especially in economic sectors that are able to absorb local workers.

Third, HDI also shows a significant negative coefficient. This highlights that improving human development indices, including access to better education, adequate health services, and improved living standards, has enormous potential to reduce poverty levels in Madura. This finding is consistent with the negative relationship between poverty and Hasibuan's research (Hasibuan, 2023) The research contradicts Leonita's conclusions (Leonita & Kurnia Sari, 2019) It asserts that the HDI has no significant and inconsistent impact on the direction of its relationship with poverty. Improvements in these aspects can improve people's quality of life and give them more opportunities to participate in the local economy.In the Madurese economic context, where the agriculture, fisheries, and tourism sectors have an important role, these findings provide a strong basis for the development of more focused policies (Dornbusch et al., 2008). Madura districts can use this information to design inclusive development strategies, ensuring more equitable economic distribution and better access to economic and social resources. As such, these efforts will not only help reduce poverty but also strengthen economic and social sustainability in Madura, supporting the vision of sustainable development for the region.

4. CONCLUSION

This study found that gross domestic products have a positive influence on poverty levels in four Madura districts: Bangkalan, Sampang, Pamekasan, and Sumenep. A positive coefficient for GRDP indicates that increasing economic activity can potentially increase poverty levels. The unequal distribution of economic sectors and community groups in these

districts could be the cause.

Research indicates the need for more inclusive economic development strategies to mitigate these impacts. These steps include increasing access to quality employment, ensuring more equitable economic distribution, and developing policies that support sustainable and inclusive economic growth in Madura. This approach aims to bolster social and economic sustainability in the region, aligning with wider sustainable development objectives, thereby enhancing the overall quality of life for the Madurese community.

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